

TECHNICAL DOCUMENTATION

APPENDIX D.

1995 American Travel Survey Data Collection and Processing Procedures

SURVEY DESIGN AND METHODOLOGY

A. INTRODUCTION

The Intermodal Surface of Transportation Efficiency Act of 1991 (ISTEA) established the Bureau of Transportation Statistics in the Department of Transportation. In December of 1992, congress formally established the BTS to compile, analyze and publish statistics; to develop a long-term data collection program; to develop guidelines to improve the credibility and effectiveness of DOT's statistics; to represent transportation interests in the statistical community; and to make statistics accessible and understandable. At about the same time, the Transportation Research Board of the National Academy of Science in their report, Data for Decisions: Requirements for National Transportation Policy Making concluded that the biggest gap in DOT's intermodal data program was in "flow data." Prior to the 1995 ATS, the most recent source of data on passenger flows is the 1977 National Travel Survey, conducted by the Bureau of the Census as a component of the Census of Transportation. To meet the need for passenger flow data, the BTS conducted the 1995 American Travel Survey (ATS). The Census Bureau implemented the ATS under its authority to conduct a Census of Transportation as stated in Title 13 of the US Code.

B. SURVEY PURPOSE

The purpose of the American Travel Survey is to obtain information about travel of persons living in the United States. Economic activity generated from people traveling represents one of the largest and most rapidly growing industrial sectors in the United States. In many areas of the country, travel-related services form the primary industries for providing income and jobs for many of the residents. In view of the importance of travel to the US economy, comprehensive information is essential to government, private industry, and others. The data will be used for policy formation and promotional activities in the general field of travel and tourism.

The main objective of the ATS was to provide policy makers with more accurate and comprehensive information than had previously been available. The ATS provides key data about characteristics of travel and travelers to assist in the formulation and evaluation of initiatives in intermodal transportation. Because policy makers have a particular interest in understanding the differences in travel patterns by state, one objective was to provide detailed information on state-to-state travel and metro-to-metro travel.

To achieve survey objectives, both cross-sectional and longitudinal estimates were needed. Key cross-sectional estimates include the proportions of people traveling on various types of



transportation, intermodal connections, (e.g., taxi from home to the airport) reasons for trips, trip duration, trip distance, and the person and household characteristics that may influence a person's travel over a period of time. Longitudinal estimates require the collection of information about a person over time. For example, one may measure the cumulative effect of travel on the transportation system or the patterns of change in travel by season.

The ATS was designed to produce reliable estimates at the national and state level for all persons and households in the United States. It also provides data on flows of travel between the states and metropolitan areas for all states and selected metropolitan areas. Data also are available for subgroups defined in terms of characteristics related to travel, such as business, vacation or combined business/pleasure, travel by age, family type, labor force status and income. Subgroups of special interest include, for example, frequent travelers, non-travelers, trips taken by children traveling without a parent, and trips taken by the elderly. The ability to produce reliable estimates at the state level for small subgroups is limited by the sample size.

C. SURVEY PLANNING AND DESIGN

1. Pretest

The Census Bureau conducted a pretest of the American Travel Survey in August 1994. The primary purpose of the pretest was to test the survey's computer-based data collection instrument, survey content, telephone number locating ability and data collection procedures. The pretest was designed to detect only major feasibility problems with questionnaire wording and procedures. It was not designed to produce a reading on data accuracy.

The pretest sample consisted of about 400 households in six Primary Sampling Units (PSUs) in two Census Regional Offices — Philadelphia and Kansas City. The Census Bureau collected data for one three-month travel period (June, July and August of 1994). The Census Bureau selected the pretest sample from expired rotations of National Crime Victimization Survey conducted by the Census Bureau. The mode of interview was Computer Assisted Telephone Interviewing (CATI) and paper and pencil interviews by telephone and by personal visit. Because of time constraints, paper and pencil interviews were substituted for the survey's Computer Assisted Personal Interviewing (CAPI) instrument.

The pretest included mailing out a travel diary in advance of the recall period for use by respondents to record their travel information. They also included a test of the post mail initial call screen telephone research (PMICSTRO) and the post mail initial call screen (PMICS) telephone

operations. The PMICSTRO was instrumental in testing and developing mechanisms to locate current telephone numbers for the sample addresses. The PMICS determined the feasibility of contacting households by telephone at the beginning of the reference period to answer any questions and to encourage participation. In addition, pretest respondents were asked questions about their use of the diary in a cognitive research module.

2. Survey Design

(a) Data Collection Schedule

Plans call for the ATS to be conducted every five years, in calendar years ending in zero and five. The sample of households was selected at the beginning of calendar year 1995 for interviewing in 1995 which began in April 1995 and continued through March 1996. The sample contained about 80,000 eligible addresses. Sample households were interviewed three to four times during this period, at approximately 3-month intervals. The survey sample was divided into three sub-samples to spread out the interview and processing workloads. These sub-samples are referred to as "waves." One wave was interviewed each month over a 3-month period. This 3-month period was called a "cycle." There were four cycles of interviewing throughout the data collection period. The travel reference months for the initial interview ranged from three to six months depending upon the date of the first month of interview. The approximate recall periods for subsequent interviews was between three and four months for the second interviews, three and five months for the third interview, and two to four months for the fourth interview. Figure 1. shows the trip months, the months the trip data were collected, the schedule of interviews by cycle and wave, and, in parenthesis, the approximate number of months of recall.

Figure 1. Trip Months, Months Data were collected Recall period

Trip Month	Data Collection Periods (Recall in Months)		
	Wave 1	Wave 2	Wave 3
January	Cycle 1, May (4)	Cycle 1, June (5)	Cycle 1, July (6)
February	Cycle 1, May (3)	Cycle 1, June (4)	Cycle 1, July (5)
March	Cycle 1, May (2)	Cycle 1, June (3)	Cycle 1, July (3)
April	Cycle 1, May (1)	Cycle 1, June (2)	Cycle 1, July (3)
May	Cycle 1 and 2 May (<1)/Aug. (3)	Cycle 1, June (1)	Cycle 1, July (2)
June	Cycle 2 August (2)	Cycle 1 and 2 June (<1)/Sept. (3)	Cycle 1, July (1)
July	Cycle 2 August (1)	Cycle 2 Sept. (2)	Cycles 1 and 2 July (<1)/Oct. (3)
August	Cycles 2 and 3 Aug. (<1)/Nov. (3)	Cycle 2 September (1)	Cycle 2 October (2)
September	Cycle 3 November (2)	Cycles 2 and 3 Sept.(<1)/Dec. (3)	Cycle 2 October (1)

October	Cycle 3 November (1)	Cycle 3 Dec. (2)/Jan. (3)	Cycles 2 and 3 Oct. (<1)/Jan. (3)
November	Cycles 3 and 4 Nov. (<1)/Jan. (2)	Cycle 3 December (1)	Cycle 3 January (2)
December	Cycle 4 Jan. (1)/Feb. (2)	Cycles 3 and 4 Dec. (<1), Jan. (1), Feb. (2)/Mar. (3)	Cycle 3 January (1)

(b) Association of persons with sample addresses

The survey population for the ATS consists of persons in households and persons in group quarters, such as dormitories, rooming houses, religious groups dwellings, and family-type housing on military bases. Persons living in military barracks and in institutions, such as prisons and nursing homes, were excluded. Persons in the sample at the time of the initial interview were interviewed as long as they remained at the sample address. When a sample person moved to a new address, he or she was not followed. However, persons who moved into a sample address after the initial interview were interviewed and information about any trips taken during the entire reference year was collected. Interviewers collected information from respondents throughout the 1995 survey, as long as respondents remained at the sample address. Persons who left the survey population through death, moving abroad, or going into a prison or other institution were considered out of scope. However, trips taken until the time they became out of scope were collected from a proxy respondent. Persons who moved into the original sample address after the initial interview are interviewed.

College dormitories and fraternity and sorority houses were part of the sample of households. Students living in these units and other types of campus housing are counted as separate households, not as members of their parents' households. Due to the high mobility of the college population, the addresses of college units remained in the sample throughout the survey. As with the sample addresses that were houses, students living in college units during the survey period were interviewed; students moving from these quarters were not followed.

Data were obtained for persons who left the eligible population between interviews. For example, data were obtained for the part of the reference period during which the person was still a part of the survey population. The procedure used for persons who moved out of households occupied by sample persons was to find out how long the person remained in the survey population (from any remaining household members) and to impute data for that period based on demographic information collected previously. In other words, people who became ineligible by moving out of the sample address were represented by

those who moved in. Entire households not interviewed during the first cycle were contacted again during the second cycle to obtain detailed second cycle data and retrospective first cycle data. Retrospective data about travel behavior of persons who were not interviewed for some other reason were collected for use in weighting estimation procedures. Retrospective data from persons who moved into a household during the travel period also were collected for use in weighting estimation procedures. Households not interviewed for any reason during a particular cycle were contacted and interviewed at a subsequent time and asked about travel taken during the missed travel quarter.

(c) Reinterview program

The reinterview program consisted of two components; response error reinterview and quality control reinterview.

The response error component allowed Census to assess data quality by measuring the accuracy of the number of trips reported, response variance for the number of trips reported and response variance for the estimates covering trip details. Census conducted response error reinterviews of original CAPI cases using CATI. The quality control component was limited to CAPI interviewers. It served as a quality control check on the interviewers to deter and detect falsification.

D. DATA COLLECTION

1. Procedures

(a) The Post Mail Initial Call Screener (PMICS) and Telephone Research Operation

(PMICSTRO) The PMICS operation was first tested during the ATS pretest in June 1994. The purpose of PMICS was to verify that the telephone number for the sample address was correct and to encourage respondents to complete their travel diary. PMICS call took place in January 1995. In January 1995, the Census Bureau added an operation to verify telephone numbers for sample households for which telephone numbers were listed or to obtain new telephone numbers for sample addresses without listed telephone numbers. This operation, the PMICSTRO, utilized the telephone centers' research tools. These tools included commercially prepared telephone databases for the entire United States as well as a library of phone directories for different locales. The telephone researchers entered the telephone information into the data collection instruments.

During PMICS each household received a phone call to describe the importance of the survey, encourage partici-

pation, explain what the respondents needed to do to record their travel, and to answer questions. Reminder post cards were sent about half way through the three month travel period to remind respondents to fill in the diary when they traveled. About four weeks prior to each cycle of interviewing, reminder letters were sent to each household to remind the respondents to expect a phone call from an interviewer.

(b) Organization and Coordination

Interviews were conducted by Census Bureau field staff under the supervision of the Census Bureau's 12 decentralized regional offices and by interviewers working under the supervision of the Census Bureau's three centralized CATI facilities. About 35,000 CAPI/CAPI designated household interviews were conducted by field representatives using laptop computers. The CAPI/CAPI interviews were conducted primarily by telephone. Personal visit interviews were used to conduct interviews for CATI/CAPI designated households which could not be contacted by telephone. The remaining 45,000 CATI designated household interviews were conducted by interviewers working with personal computers from Census' three centralized telephone facilities located in Tucson Arizona, Jeffersonville Indiana, and Hagerstown Maryland.

(c) Household Respondent

Any person 18 or over who was present at the time of the interview was allowed to report for themselves and other household members unless this person was not physically or mentally able to do so. Proxy responses were accepted for persons as long as the respondent was knowledgeable about the other household members' travels. Persons aged 16 or 17 were allowed to report for themselves and other household members if no other knowledgeable person aged 18 and over was present at the time of the interview. Information for all persons aged 15 and under was collected from a knowledgeable adult.

(d) Interview Length

The length of a household interview depended in part on the number of trips taken by the household members. The 1994 pretest length of interview was, on average, 28 minutes. The average length of interview for the 1995 ATS survey was approximately 25 minutes.

2. Materials

Sample households received a series of advance letters prior to each interview. These included a prenotice letter, survey package (letter, calendar/diary, and map), introductory telephone call, post cards to remind household

members to continue to keep track of their travel information, and reminder letters about one month prior to each subsequent interview. The prenotice letter served as a notice to the respondent that the household had been selected for the survey. It also provided information about the survey. The letters were signed by the Secretary of Commerce and the Secretary of Transportation. The survey package included a second letter containing more detail about the ATS and answers to some frequently asked questions. A travel calendar was included in the survey package. The calendar contained instructions on how to use it to record travel information and space to record the details of travel taken during the travel period. The calendar was used as a recall aid during the interview only. It was not collected from the respondent to fill in responses to survey questions.

The use of records, such as the calendar provided in the survey package, a personal calendar, receipts from airlines, trains, buses, hotels, etc., during the interview may have helped respondents to provide more accurate information. Interviewers were instructed (as part of the instrument) to encourage respondents to take time to get their records for reference during the interview. In addition, interviewers were provided with a United States atlas for their own reference during the interview. In a debriefing of the 1994 ATS pretest sample of 409 respondents, 41 percent said they had referred to their diaries. An additional 25 percent said they used their own records to help in remembering travel information. Because diary usage was lower than expected and based on comments from both the pretest respondents and interviewers, the diary for the actual survey was redesigned to look and function like a wall calendar with large spaces provided to record travel details.

3. Data collection instruments

The primary data collection instrument for the ATS was the questionnaire programmed for the computer in the CASES software language. The instrument was divided into three sections. The first section collected basic demographic information. The second section of the questionnaire obtained travel-related data. The third section obtained general information on the household income, availability of transportation to members of the household and information needed to contact the household for the next cycle interviews. The instrument sections are described in detail below:

(a) Demographic Characteristics

Demographic information was collected at cycle one

interviews and updated at each subsequent cycle. Questions included relationship to respondent, sex, age, education, marital status, Hispanic origin and race. At the start of the first interview, the interviewer recorded these characteristics for each person residing at the sample address. In subsequent interviews, the interviewer updated the demographic characteristics of persons, e.g., a change in marital status. These data items were carried from cycle to cycle to help the interviewer determine which questions needed to be verified. Persons under the age of 17 were not asked questions about educational attainment. Persons under the age of 15 were not asked about their activity or their marital status. The household telephone number and address were verified and recorded in case callbacks were needed to obtain information from a sample person not present at the time of the interview.

(b) Trip Questions

Questions included the number of trips away from home, the dates of the trip, and whether or not household members or other persons traveled with the respondent. The questions also included trip origin and main destination, the number of nights stayed, type of lodging, all types of transportation used to get to the destination, the reasons for the trip, and information on stops along the way and side trips taken after reaching the destination. There were no questions about trip related expenditures. A trip, as defined for the respondent, was any trip taken by any member of the household that is 75 miles or more one way. The trip origin was the sample address for household members that lived at the sample address during the entire reference period. For households or persons who moved into the sample address and had taken trips from their previous residence, the previous residence was considered the trip origin. Travel excluded from the survey was: 1) travel by the Armed Forces while on active duty; 2) travel by members of airplane, train, bus or ship crews; and 3) travel by long haul truck drivers.

Trip information was collected in the order in which the respondent reported the trips. Trip questions were sequenced in roughly chronological order. For example, after the main destination and dates of a trip were obtained, the respondent was asked to report the mode of transportation, reason for the trip, travel partners, stops along the way to the main destination, type of lodging at the main destination, overnight side trips away from and returning to the main destination, and stops on the way home. Since some trips were taken by more than one member of the household, information was collected from the respondent first, then information about other household members' trips was collected (excluding trips already reported).

Questions concerning identical trips—trips taken on a regular basis with the same destination, mode, reason for travel and travel party were only asked about once during each interview. A subset of questions that established the dates of the repeated travel were asked for up to 4 of the identical trips. The data collection instrument limited the follow up questions to 4 identical trips. Trip data were imputed during data processing when more than 4 identical trips were reported.

The interview proceeded on a trip by trip and person by person basis until the questionnaire was completed for all trips taken by each household member. If there was one knowledgeable respondent who was familiar with travel taken by some or all members of the household, he or she served as a proxy respondent for other household member's trips by providing trip screener and trip detail information for those household members. If the first adult respondent was not knowledgeable about other household members' trips, another knowledgeable respondent was asked about all person's trips or each household member was asked about their own trips.

In all interviews after the first interview, household members were asked to report about trips taken since the last interview. A data bounding procedure was used to reduce the possibility of reporting trips more than once. In all interviews after the first one, households were asked to report the trips taken since the last interview. Trip data for up to 10 trips reported in the previous interview were included in the data collection instrument for each subsequent interview. Interviewers used the destination and date data from these trips to prevent the respondent from reporting a trip more than once; the respondents did not have access to the bounding data. The interviewers referred to the data when it was apparent that the respondent may have been reporting trip information that had been reported in the previous interview. This procedure defined the reference period in question and reduced the reporting of duplicate trips. Duplicate trips reported in more than one cycle were deleted during the edit process.

In addition to information about the core trip, questions were asked about any stops on the way to the main destination or on the way home from the main destination, as well as side trips from the main destination. Question about stops included a place name of each stop or side trip, duration of stop, the reason for the stop or side trip, modes of transportation, and type of lodging.

c. General Household Information

The general household information section included questions about employment status, number and type of

vehicles in the household, family or individual income, and best time to call information. If the household composition remained intact over the 4 interview cycles, the household income questions were asked at the time of the first cycle interview only. The best date and time to call information was updated at each interview.

4. Interviewers

a. Characteristics and Training

The ATS interviewers were trained in April 1995. A large majority of the interviewers were women. Interviewers were paid on an hourly basis, receiving between \$8.00 and \$12.00 per hour. Training for ATS interviewers included a home study, classroom training, on-the-job training and refresher training. Training sessions included lectures, audiovisual presentations, mock-interviews, and classroom discussion. Trainees received detailed information about their role as an interviewer, concepts and definitions used in the survey, and specific interviewing techniques. As part of the initial training, each new interviewer practiced several interviews. Interviewers received training on new information and on special aspects of the survey as needed during the survey period. Interviewers found to be weak in certain aspects of the survey received supplemental training to help them meet response rate and accuracy standards. The interviewers completed most of their assigned cases during the first two weeks of each month of interviewing.

b. Supervision and Quality Assurance

The regional office and telephone center supervisors monitored the work of the interviewers. The headquarters-based response error and quality assurance programs also served to monitor the interviewers. The work of each interviewer was observed by a supervisor who checked the interviewer's performance in establishing rapport with the respondents, asking questions in an appropriate manner, probing, and recording answers accurately. The results of the observations were discussed with the interviewers. Interviewers whose performance was below standard in some respect were observed more often.

The quality control reinterview program served the dual purposes of checking a sample of the work of the individual interviewers and identifying aspects of the field procedures which needed improvement. The quality assurance reinterview sample covered about 5 percent of each interviewer's work each month. The reinterviews, which were completed as soon as possible after the original interview, were conducted on the telephone by a supervisor. Reinterviews were used to determine whether the inter-

viewers conducted the interview at the correct address, classified noninterviews correctly and determined household composition correctly. Several questionnaire items were checked to verify that the interviewer asked these items during the original interview. The results of the reinterview were used to take corrective action, such as supplemental training.

E. Data Processing

1. Mileage Estimation

The measurement of trip mileage in the ATS is an important factor for at least two reasons: 1) to determine whether the distance traveled was sufficient to meet the 100-mile trip definition, (although ATS asks respondents to provide information on all trips of 75 miles or more, published data includes information only for those trips of 100 miles or more); and 2) to get an estimate of total miles traveled from origin to destination and return. The trip mileage estimates were calculated by the Center for Transportation Analysis at the Oak Ridge National Laboratory (ORNL) located in Oak Ridge, Tennessee. The trip mileage estimation procedure was a two-step process that involved the assignment of zipcodes to the reported origin and destination names and the coding of the trips' distances. In the first step Census assigned zipcodes to the reported origins and destinations by using computer and clerical processes. ORNL assigned zipcodes for those locations that the Census was not able to code. In the second step the ORNL used transportation network databases to calculate trip mileage. The network distance was used to determine if the trip met the survey's minimum 100-mile one-way distance.

2. Consistency Edits and Imputations

The data were edited to create data consistency and to impute for missing data items. The data were first subjected to processing steps to convert the survey data from the CASES generated output to SAS data sets. The data sets were formatted to contain separate household, person and various trip level files. The data sets were then subjected to edits that improved the survey data by reconciling inconsistencies in the trip data, eliminating trips that had been reported more than once, and replicating identical trips. Demographic and income edits were performed to ensure the consistency of the reported data. Data also were imputed for missing race, sex, relationship, age, origin and income data. The imputation sources were based on the demographic data that was reported in the first cycle of the interviews. Missing trip data such as dates, nights of travel, destinations, lodging, mode and reason for travel also were

imputed based on reported responses in the data collection cycle and the ORNL mileage models. Separate computer and clerical operations were used to assign unique person identifiers across each of the survey cycles. The identifiers serve as a key to link the last cycle interview household, person and trip data over the survey cycles. In addition, a clerical procedure was employed to code write in responses

to the existing answer categories. This served to reduce item nonresponse. Census also used computer and clerical checks to review and approve the various processing stages. Additional computer operations prepared the micro data files for this preliminary release of the data in a tabulated form. Disclosure avoidance programs to suppress identifiable data were not used for the tabulated data.